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EXAMINER

ZERVIGON, RUDY

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/775,664

Applicant(s)

SHUFFLEBOTHAM ET AL.

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 50-53,55-63 and 65-71 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 50-53,55-63 and 65-71 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 7, 2003 has been entered.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 50-53, 55-58, 60-62, and 65-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (U.S.Pat. 5,522,934). Suzuki et al teaches an PECVD (column 4, lines 5-18) ICP reactor (Fig.8) with a plasma processing chamber (4, Fig.8; column 3, lines 55-57). A ceramic ("anodized aluminum"; column 4, lines 19-25) substrate holder (6, Fig. 2, 8) is shown (column 4, lines 19-36) supporting a substrate ("W") within the processing chamber with an electrode (18) buried within the ceramic material (6). An electrically-conductive planar coil (22, Figure 8) disposed outside the process chamber (column 12, lines 23-27) and connected to an RF energy source (32, Fig.8) for energizing the process gas into a plasma state. A process gas distribution

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system (54, Figure 11; column 10, lines 33-43) for gas introduction into the process chamber (4, Figure 8). The process gas distribution system comprising injectors (64B of 56B; Figure 8, 9, 11) with orifice (58B; Figure 9, 11) at least some of which direct the process gas along an axis that intersects the substrate at an acute angle, these same injectors being spaced outwardly from the periphery of the substrate (Figure 8, 11). Suzuki further teaches wafer temperature control means (column 4, lines 45-55; column 13, line 62 – column 14, line 4).

Claims 51, 52, 53 – Suzuki additionally teaches silane (silicon-containing reactant gas) and oxygen as described in the specification (column 6, line 51). With regard to Suzuki not teaching phosphorous and boron containing gases - It has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Claim 55 – Suzuki further teaches operating pressures of about 1mTorr (column 16, lines 38-44).

Claims 56, 66 - Suzuki further teaches a ceramic (“anodized aluminum”; column 4, lines 19-25) substrate holder (6, Fig. 2, 8) is shown (column 4, lines 19-36) supporting a substrate (“W”) within the processing chamber with an electrode (18) buried within the ceramic material (6).

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Claim 57 - Suzuki further teaches a process gas distribution system for introducing the process gas wherein the gas injectors include orifices (62, 58A, 58B; Figure 11), and at least some of the orifices orientating the process gas along an axis of injection which intersects an exposed surface of the substrate at an acute angle – column 10, lines 28-42; Claims 60-62, 68, 69, 70 – Suzuki further teaches a process gas distribution system for introducing the process gas comprising a primary (56B of 54; Figure 10, 11) and secondary gas rings (56A of 54; Figure 10, 11) that directs the process gas toward the substrate (column 10, lines 28-33) along injectors (64A,B; Figure 9; column 10, lines 10-20).

67 - Suzuki further teaches an RF bias power source (“power supply (not shown)”); column 4, lines 42-54) connected to the electrode (18, Figure 2), wherein the RF bias power source is operable to regulate a level of RF bias applied to the substrate so as to control the substrate temperature (column 4, lines 42-54).

71 – the plurality of gas flows (from each of the injectors) overlap each other in a plane parallel to an exposed surface of the substrate (Figures 8-11)

Suzuki does not teach that all of his injectors, other than outward injectors (64B of 56B; Figure 8, 9, 11), of the process gas distribution system are spaced outwardly from the periphery of the substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to widen the radial dimension of Suzuki's process gas distribution system (54, Figure 11; column 10, lines 33-43) thereby providing all his injectors of the process gas distribution system being spaced outwardly from the periphery of the substrate.

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Motivation to widen the radial dimension of Suzuki's process gas distribution system thereby providing all his injectors of the process gas distribution system being spaced outwardly from the periphery of the substrate is to improve the in-plane uniformity of the deposited film as taught by Suzuki (Figures 5,6,7a-7c; column 6, line 38 – column 7, line 60). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04).

4. Claims 59 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (U.S.Pat. 5,522,934) in view of Young et al (USPat. 5,851,294). Suzuki is discussed above. However, Suzuki does not teach that the orifice of his injectors direct the process gas in a upward direction away from the substrate. Young teaches a similar gas injection manifold (Figure 1, 4). Inclusive, Young teaches the orifice of his injectors (34, Figure 4) direct the process gas in a upward direction ( $\alpha$ , Figure 4; column 4, lines 1-11) away from the substrate (compare Figure 4 and Figure 1,5)

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Suzuki to optimize the angle of his injectors so the process gas is directed in a upward direction away from the substrate as taught by Young.

Motivation for Suzuki to optimize the angle of his injectors so the process gas is directed in a upward direction away from the substrate is to optimize the flow of the process gas as taught by Young (column 4, lines 1-11).

***Response to Arguments***

5. Applicant's arguments, see Pages 8-11, filed May 7, 2003, with respect to the rejection of claims 50-53, 55-58, 60-62, 64 and 65-71 under 35 U.S.C. 102(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Suzuki et al (U.S.Pat. 5,522,934) under 35 U.S.C. 103(a).

6. Applicant's arguments, see Page 11, filed May 7, 2003, with respect to the rejection of claims 59 and 63 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Young et al (USPat. 5,851,294) under 35 U.S.C. 103(a).

7. Applicant's arguments are directed solely to the amendments filed in the response to the final rejection (paper 13). In response, the Examiner directs Applicant to the body of the above new rejections reflecting the amendments filed in the response to the final rejection.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering

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art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

*Gregory L. Mills*  
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